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ABSTRACT

The need for timely, accurate, and locally relevant career information has been escalating. Within the last 15 years, computer-based systems have been developed that put occupational descriptions, labor market information, plus education, training, and financial aid information into formats usable by students and adults in school and nonschool settings. The proliferation of systems marketed competitively, the increasing depth and breadth of information available, plus the sophistication of the guidance aspects of systems have produced a consumer's dream, but also a major dilemma. Selection of a system for a statewide or substate unit that corresponds to the particular needs of the targeted constituency requires thorough knowledge of the prospective users' characteristics, material and human resources available, hardware capacities, software content, and hardware/software compatibility. All of these factors were taken into consideration during the Career Information Delivery System Feasibility Study in Illinois, and the study provides a model for the selection process. (Various computer-based occupational information delivery systems are described in this paper, comparisons are made, and systems selected by various states are discussed.) (Author/KC)

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Computerized Systems of Career Information and Guidance: A State-of-the-Art

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Abstract

The need for timely, accurate and locally relevant career information has been escalating. Within the last fifteen years, computer-based systems have been developed which put occupational descriptions, labor market information, plus education, training and financial aid information into formats usable by students and adults in school and non-school settings. The proliferation of systems marketed competitively, the increasing depth and breadth of information available, plus the sophistication of the guidance aspects of systems has produced a consumer's dream, but also a major dilemma. Selection of a system for a statewide or substate unit which corresponds to the particular needs of the targeted constituency requires thorough knowledge of the prospective users' characteristics, material and human resources available, hardware capacities, software content and hardware/software compatibility. This paper provides a context for understanding the properties of computer-based systems, their theoretical approaches and the dimensions to the problem of selection.

INTRODUCTION

Historical Perspective

The need for timely, accurate and locally relevant career information has been escalating as new technologies, changing demographics and other societal forces impact on the economy. Heightened awareness of the importance of rational career decision-making is the result of the increasingly expressed desire of young and old alike to derive satisfaction as well as salary from work, the accelerating pace of job/career changing, and the assertion by special groups (women, minorities, handicapped) of their right to work at interesting, challenging and equitably remunerative jobs. Moreover, legislation mandating the screening in of the disadvantaged places a heavy burden on counselors to facilitate the passage from unemployment or secondary labor market jobs to continuous work that enables self-sufficiency.

Development of computer-based career information and guidance systems is the result of the convergence of the increasing demand for information and a vehicle capable of providing the necessary storage and access to data. Furthermore, additional attributes of computer technology make manageable the increasingly complex task of career decision-making. Inherently there is a systematic approach, a logical process, the ability to control the addition and deletion of information as one searches occupations.

Free Choice

At the foundation of these systems is the conviction that personal choice is the basis for occupational selection. The

cornerstone of contemporary career scholarship and practice is the emphasis on free choice in occupational selection. The underlying assumption is that enlargement of a person's occupational horizon beyond parental, class or cultural dictates contributes to the equalization of employment opportunity. The essential purpose of open exploration in searching these systems for occupation and education information is to increase awareness of options and opportunities.

Entitlement

Emerging concurrently with the expanded freedom to choose occupations is what Daniel Yankelovich (1) describes as a shift in work attitudes. His entitlement theory postulates that, increasingly, individuals are demanding that work be satisfying and that each person not only has the right to a job but the right to a good job. As a consequence, career choice is rendered even more difficult by the necessity to select an occupation that is likely to be satisfying and rewarding. The importance of career information and guidance systems thus can be understood in respect to the heightened capability of the individual to predict accurately the degree of self-fullfillment achievable in occupations being considered. In a sense, the exploration process encourages the user to imagine himself in various occupations. Clearly the more information brought to bear on the process, the more reliable will be the predictions.

Informed choice involves the deliberate assessment of available options. Recognition that there is need for dependable,

timely information has been growing steadily as career decision-making involves the weighing of a number of personal factors (e.g., interests, aptitudes, skills, physical handicaps or limitations, mobility constraints and family responsibilities) against occupational factors (e.g., educational or training requirements, wages, work conditions and employment projections).

Life Span

Complicating the process of career selection still further is the current fluid nature of work and careers. Initially, career choice was a task for young people which involved formulating goals based on an assessment of interests and aptitudes. This youthful evaluation, generally conducted during or immediately following adolescence, was expected to remain viable for a lifetime. Information needs were largely confined to measures of self (2).

Other early theorists describe career almost solely in organizational terms as the sequence of jobs held within a particular context (3,4,5). Information needs of individuals from this perspective are related to knowledge regarding requisite preparation (degrees, credentials, etc.) to gain entry. Current scholarship suggests an integration of the individual and organizational perspectives, particularly in view of the enlarging numbers of people who move between and among employers and change careers four to twelve times -- or more (6).

Perhaps the best illustration of this metamorphis is the evolution of thinking represented by Eli Ginzberg (7) whose early work described occupational choice as completed by the early or middle twenties. In a later work, Ginzberg (8) revised his earlier position and insisted that occupational choice is actually open-ended throughout a person's life and that training needs to be continuous as men and women seek to find the best occupational fit betweeen their changing desires and their changing circumstances.

In this more dynamic situation, information needs are significantly multiplied. Measures of self are still germaine, but of equal and occasionally greater importance are assessments of the attainability of career goals. Bottlenecks in teaching and some engineering professions and shortages of skilled technicians reveal the consequences of not putting goals to the reality test of the market place. Increasingly, labor market information is being recognized as a vital component of career decision-making.

"Good" choice certainly benefits the individual in terms of lifestyle, work satisfaction and continuous employability; however, society too has a stake in individual choice. Few economies can long survive the effects of widespread mismatch between occupational choice and employer needs. Such a conflict would be exacerbated in an economy reliant on steady technological advancement.

Evolution of Computer-based Career Information Systems

Economic dislocations and labor market imbalances have spurred federal and state initiatives to insure the collection, accessibility and quality of relevant information. Legislation has

mandated that the departments of education and labor coalesce on issues related to the dissemination of occupational information (See Figure 1).

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insert Figure 1 about here
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As a consequence, computerized occupational/career information and guidance delivery systems have been encouraged by federal grants to states.

The evolution of programs involving computer-based information and guidance is also reflected in the nomenclature related to the system. In 1970 the Department of Labor (DOL) awarded grants to eight states to provide for the development of occupational information services to students and out-of-school youth. The Oregon Career Information System funded in 1969 served as the model for the developing programs.

These nine DOL grantees called their programs occupational information systems (OIS). Subsequently, the designation was altered to career information system (CIS) emphasizing the lifelong decision-making component of the system and highlighting a process which correlates goals and opportunities. The connotation attached to occupation had been a process limited to matching people and jobs. The latest funded programs under the National Occupational Information Coordinating Committee (NOICC) are referred to as career information delivery systems (CIDS), pointing to the dissemination process as a strategic part of the career information equation. The current outlook has expanded to incorporate multiple delivery modes as adjunct or augmenting

Figure 1

Major Contributing Legislation

The Vocational Education Act (1963) confirmed the determination of the U.S. to provide vocational education to all persons in all communities and to prepare individuals for gainful employment.

The Educational Amendments (1968) emphasized vocational guidance; provided funding for fully functioning career guidance programs.

The Comprehensive Employment and Training Act-CETA (1973) enabled local control of manpower training programs; provided for more direct counseling and information services for clients.

The Career Educational Demonstration Act (1974) established the office of Career Education; distributed funds in support of promising career education activities.

The Education Amendments (1976) established the Educational Information Centers (EIC) programs to provide educational information, guidance, counseling and referral services; created the National Occupational Information Coordinating Committee (NOICC) to coordinate development and delivery of occupational information.

The Career Education Incentives Act (1977) provided support for career guidance and information delivery systems.

The Youth Employment and Demonstration Projects Act-YEDPA (1977) broadened the mandate of the NOICC to give special attention to the labor market information needs of youth, including encouragement for the expansion of employment counseling services and assistance with the development of computerized guidance systems.

The Labor Market Information and Job Bank Program (1978) provided for the development of a comprehensive system of labor market information on a national, state and local basis.

modes to computer-based inquiry. Needlesort, microfiche, printed material and films are viewed not as supplementary but as integral parts of a delivery system configuration. The elements are selectable as indicated by user needs or as a result of provider cost considerations.

Computer systems are dependent on the availability of career and labor market information that includes occupational projections, openings, wages, labor turnover and employment outlook by occupation and by location. Data collection by federal and state agencies has expanded to provide the requisite quantitative information. Increasingly a qualitative element is being added to available governmental data. More information regarding worker-trait components has been included with more details concerning the quality of work life associated with a particular occupation.

Within the last fifteen years computer-based guidance and information systems have been developed which put occupational descriptions, labor market information, plus education, training and financial aid information into formats usable by students (elementary through graduate school), out-of-school youth and adults. Evaluations of computer systems indicate high user acceptance and increased vocational maturity (9).

Computers do not replace human interaction; actually the computer capacity for storage and retrieval of information regarding occupations, employment outlook projections, financial aid opportunities, apprenticeships, plus school and college curriculum descriptions, considerably expands the abilities of any one counselor or staff of counselors and information special-

ists to provide accurate, comprehensive data immediately. In essence, the computer frees the counselor from the tasks connected with information gathering and processing and permits him/her to focus, with students or clients, on the more affective aspects of career choice.

Some computer systems are programmed to correlate external information (e.g., occupations, educational and training opportunities) with personal data (e., location requirements, values, aptitude indicators and financial constraints). Some systems expand the data dissemination component to include assistance in the decision-making process.

The development of computer-based career systems parallels the increasing attention paid to career exploration, planning and management by counseling psychologists, educators, industrial and organizational psychologists and human resource strategists. The literature evolving in three areas -- career exploration, planning and decision-making reflects concern that career guidance approaches inevitably involve all three crucial elements (10). The first generation of systems used a simple personal characteristics questionnaire to access a limited data base. The primary purpose was to assist students to make decisions regarding higher education. Other systems developed which provided more data about occupations, included local employment opportunities and outlook and enlarged the educational listings to include training institutions. More sophisticated access strategies permitted cross-referencing and encouraged the linking of various goals to a number of occupations and a variety of preparation possibilities. Increasingly, current systems are being designed for

adults as well as youth, to be used in school and nonschool settings and to move the user through values clarification, decision-making exercises and then into the data bases.

Objectives of This Paper

Given the proliferation of systems marketed competitively, the increase in the quantitative and qualitative career/occupational and labor market information available and the sophisticated guidance components of systems, the selection of a career information system suited to the particular needs of the targeted constituency becomes a major dilemma. Selection of such a system for a statewide or substate unit which corresponds to these needs requires thorough knowledge of the prospective users' characteristics, material and human resources available, hardware capacities, software content and hardware/software compatibility.

This paper provides a framework for understanding the properties of computer-based systems, their theoretical approaches and the dimensions to the problem of selection. Specifically, this paper describes the systems based on their common characteristics, addresses the issue of effectiveness and discusses the Illinois Career Information Delivery System (CIDS) Feasibility Study which dealt with the problem of system selection.

LITERATURE REVIEW

Introduction

The term "career information system" has been used in the literature to refer to all types of systems -- print, microfiche, batch-process, online information and/or guidance. The term as used here refers to computer-based systems primarily and to online information and/or guidance systems in particular.

Categories of Systems

The use of the computer by counselors in career guidance is a relatively recent phenomenon; only in the last fifteen years or so have systems been developed which allow usage by large numbers of youth and adults. Even so, some thirty systems have been designed, partially and/or fully developed (11,12).

Some of these career information systems involve automation of the guidance philosophy and techniques of the counselor. Other system designers have analyzed the end goals of the counseling process and have sought to design a program which would accomplish these goals by making maximum use of the computer's capabilities. Some systems deal only with educational and occupational information, while others encompass values clarification and the decision-making process. Some systems provide direct access to the computer via a typewriter-like keyboard or cathode-ray tube (CRT) terminals, while others require the use of an optically-scanned questionnaire as an access mode to the computer.

Computer-based systems can be divided into three general categories: batch-process systems, online career information systems and online career guidance systems (13,12,14). Figure 2 lists the systems of each type and summarizes their characteristics. Figure 3 is a list of systems and their acronyms for reference.

Insert Figures 2 & 3 about here

The following discussion describes these three types of computer-based career information systems. In addition, a widely-used category of non-computer systems is discussed. Finally, a proposed expansion of computer-assisted instruction into the career information and guidance area is presented.

Batch-process systems. Batch-process systems normally consist of a large CPU in one location that stores data files of occupational characteristics, descriptions of colleges and universities and sources of financial aids. Typically, the user of the system completes a form, indicating and prioritizing the characteristics desired in an occupation, a college or financial aid. Some systems use a person's ability and interest test scores as well. These forms are sent to the computer site where the user-provided information is punched onto cards or run through an optical scanning device and processed. The user later receives a printout which states the occupation or occupational patterns that match his/her characteristics and similarly lists relevant colleges or other training and education information. Although the user is not in direct communication with the computer and feedback may be delayed up to two or three weeks, this type of system assists individuals in the decision-making process by using a computer to search large data files and identify options.

Figure 2

Categories of Computer-based Career Information Systems

TYPE	SYSTEMS	COMMON CHARACTERISTICS
BATCH-PROCESS --information storage and retrieval	SEARCH VIP VOCOMP	--user has no direct contact with the computer --user completes a questionnaire with the desired characteristics of an occupation and/or a school --a list of schools and/or occupations with the desired combination of characteristics is printed --least expensive way of using a computer to provide career guidance information by utilizing existing CPUs
ONLINE CAREER INFORMATION --online information storage and retrieval	CHOICES CIS COIN CVIS ECES GIS SCAD	--interactive, structured interviews between user and computer --sophisticated search strategies which allow: constant knowledge of the effect of each choice made, opportunity to erase former choices and redo searches with different sets of characteristics
ONLINE CAREER GUIDANCE --online systems that deliver significant guidance content beyond career information	DISCOVER EXPLORE SIGI	--provides: capability for computer-assisted instruction; simulation exercises in areas of values clarification, decision-making and classification of occupations --assistance in assessment of current status of career development --online administration and interpretation of testing instruments

Figure 3

Systems

Acronym	System Name	Developer/Representative
AEL	Appalachia Educational Laboratory (print system only)	McKnight Publishing Co. Bloomington, IL.
CHOICES 1976	Computerized Heuristic Occupational Information and Career Exploration System	Phillip S. Jarvis Canada Systems Group Ottawa, Ontario
CIS 1969	Career Information System	Dr. Bruce McKinlay University of Oregon Eugene, Oregon
COIN 1978	Coordinated Occupational Information Network	Dr. Rodney Durgin COIN, Inc.
CVIS 1967	Computerized Vocational Information System	Carol M. Rabush CVIS Distribution Center Western Maryland College Westminster, Maryland
DISCOVER 1976		Dr. Joann Harris-Bowlesbey DISCOVER Foundation, Inc. Westminster, Maryland or IBM Corporation White Plans, New York
ECES 1966	Educational and Career Exploration System	Dr. Alva E. Mallory, Jr. Genessee Intermediate School District Flint, Michigan
EXPLORE 1980		Dr. Joann Harris-Bowlesbey Mr. Charles Maloy Towson State University Towson, Maryland
GIS III 1971	Guidance Information System	Linda Kobylarz TimeShare Corporation West Hartford, Connecticut
SCAD 1979	Student Career Assessment and Determination	Laurence G. Lloyd Evaluation Techniques Consortium Chatsworth, California
SEARCH 1970	System Exploration and Research for Career Help	State of Oregon Employment Division Department of Human Resources Salem, Oregon
SIGI 1972	System of Interactive Guidance and Information	Dr. Martin R. Katz Educational Testing Service Princeton, New Jersey
VIEW 1970	Vital Information for Education and Work	Center for Career Development Services Florida Department of Education Tallahassee, Florida
VIP 1976	Vocational Information Program	John Cripe Joliet Junior College Joliet, Illinois
VOCOMP 1978		Gary and Marjorie Colter Innovative Software Wooland Hills, California

Online career information systems. Once remote communication with the computer mainframe was allowed via phone lines or cables and terminals, online career information systems emerged. In these systems, large data files are stored in the computer with the user given instant access to them through remote terminals. Inter-active dialog was developed in order to provide immediate communication between the computer and the user. With online career information systems, users are provided the capability of fast retrieval of large data files as well as sophisticated file searches; this allows them to control the addition and deletion of personal and occupational characteristics. Users are provided the opportunity to explore many options, recycle through search strategies using various characteristics and consider different options based on these characteristics. Two important attributes of online systems are that the user communicates directly with the computer and has a high level of control over its functions.

Online career guidance systems. The third category of system, online career guidance, harnesses the computer to assist individuals in better understanding the elements of career decision-making. In addition to providing the functions of the previously-described online informationtype, these systems add components which traditionally have been part of one-on-one or group counseling, for instance, clarification of values. These guidance components are grounded in the theoretical foundations of Tiedeman (15), Katz (16), Super (17,18) and Holland (19), among others. They

attempt to present a systematic approach to the career decision-making process. Such systems have given emphasis to the teaching of a decision-making process which can be used in subsequent career transitions.

Furthermore, these systems are capable of storing and retrieving information about their users, allowing continuity in the use of the system. This information can include grades, interests, values, skills and test scores, as well as a record of system modules the user has completed.

Non-computer systems. One of the earliest and most widely used career information systems is a print and microfiche/microfilm system called VIEW. The name VIEW is not copyrighted and the various VIEW materials in approximately 35 states are not produced, distributed or controlled by a central organization (20). Generally, VIEW materials consist of a deck of microfilm aperture cards. Each card contains four typed and/or illustrated pages of information. The cards are inserted into a viewing machine which may have the ability to make printed copies that the user can take away.

Computer-assisted instruction systems. Even before the origin of computer-based career information systems, computer-based systems were explored for instruction. The history of computer-assisted instruction (CAI) goes back to the early 1950s when Dr. Donald Bitzer developed PLATO at the University of Illinois (21). While the previous applications of PLATO have utilized CRT

or hardcopy terminals for individualized instruction, expansion of PLATO to include courses in career guidance and job search has been undertaken. The prospect of extending computer capabilities to incorporate guidance, information and instruction was explored as part of the Illinois CIDS Feasibility Study.

Effectiveness of Career Information Systems

There have been few comparative studies of computer-based career information systems. An example of such a study is Douglas (22), in which counselors, principals and computer personnel were surveyed in a comparison of CVIS, GIS, EUREKA (the California version of CIS) and SIGI. Results showed that all four systems were successful, but that each had limitations which must be understood.

Several other studies have compiled and consolidated information on many systems. Among the most current and comprehensive studies, commissioned by the National Institute of Education, in conjunction with NOICC, is Shatkin, Weber & Chapman (20). This study surveyed, described and compared twelve computerized system. This study also consolidated the literature on career information resources and delivery systems and cataloged recent publications and audio-visual materials.

The Rath, Jacobson & Grabowski (23) CIDS Feasibility Study for the state of Illinois provided extensive descriptions of the most widely-used systems and also presented up-to-date information on the twenty-five states with statewide career information systems.

Morgan Management Systems, Inc. (12) compiled a comprehensive study comparing what they termed vocational information systems (CHOICES, CIS, CVIS, MOIS, WOIS) and career guidance systems (DISCOVER, ECES, SIGI). A study for the California Department of Education (24) was also quite comprehensive in its descriptions of vendor systems.

Other comparative studies have been done, primarily on an informal basis. These include studies commissioned by Florida (25), North Carolina (26) and Virginia (27).

State Systems

Approximately twenty-five states have implemented or are in the process of implementing statewide systems. Statewide career information systems were developed to meet the increasing need of youth and adults for relevant, reliable and current information about education and occupations. Generally, career information systems provide the following to meet those needs:

- development and maintenance of accurate, reliable, current and locally relevant occupational and educational information;
- management of the delivery systems to ensure that the developed information is accessible to users in usable formats and at convenient locations;
- continuing assistance to user agencies and institutions through training, technical assistance and supportive materials to encourage utilization of the system by individuals, educators and counselors.

Systems organized on a statewide level have several advantages. Economies of scale for costly services, such as information production, system maintenance and management, computer hardware acquisition and telecommunication networks, can be achieved. Services can become available to large numbers and diverse sets of users. Concentration of resources can allow better data collection and more reliable manpower forecasting and planning for local sub-state regions, as well as for the entire state. Thus, the development of a statewide system can benefit both the individual user and the state.

Figure 3 presents a breakdown of states and their chosen career information systems.

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insert Figure 4 about here

Figure 4

Department of Labor and

National Occupational Information Coordinating Committee Grantees

DOL: 1969 Occupational Information System

Oregon-CIS

DOL: 1970 Occupational Information System

1974 Career Information System

Alabama--GIS
Colorado--CIS
Massachusetts-CIS
Michigan--MOIS
Minnesota--GIS
Ohio--GIS
Washington--CIS
Wisconsin--GIS

NOICC: 1979 Career Information Delivery System

Alaska--CIS
Arizona--GIS
Connecticut--GIS
Delaware--CHOICES
Florida--CHOICES
Georgia-CIS
Hawaii--CIS
Iowa--CIS
Kansas--CHOICES
Maine--GIS
Maryland--to be determined
Nebraska--CIS
New York--GIS/CHOICES
North Carolina--CHOICES
South Carolina--COIN

THE ILLINOIS FEASIBILITY STUDY

Objectives of the Illinois Study

Given the range of capabilities of the various career information systems and the large number of systems, the problem faced by the Illinois Occupational Information Coordinating Committee (IOICC) and the Career Information Policy and Advisory Committee (CIPAC) was to establish an Illinois CIDS which would best serve Illinois users' needs.

The objective of the CIDS Feasibility Study (23) was to make recommendations to the CIPAC concerning the selection of a vendor system and its implementation as a statewide career information delivery system. The mandate for an Illinois CIDS as outlined by the IOICC was to provide high quality career information to students and clients who need it, especially those who would not otherwise have access to it. In addition, the CIDS was to meet the particular needs of the broadest possible spectrum of career information users. The recommendations to be made by the Project Staff, therefore, were to address a complex set of issues: target groups, delivery network, vendor system, management structure, financing, policy advisory function and relationship to existing career and educational guidance and information programs. A structured, compehensive analysis was required to meet the mandates and make the recommendations stipulated by the IOICC. It was this methodology that set the CIDS Feasibility Study apart from others.

Phases of the Illinois Study

Overview. The primary effort of the feasibility study was to develop a set of system criteria, which would ultimately be used to evaluate the vendor systems, and an analytical evaluation model, which would be capable of handling both the large number and broad range of criteria.

Review of the literature. The first step in developing the system criteria was to review the literature, published standards for systems as well as feasibility studies conducted by other states. System standards have been developed by the Association of Computer-based Systems for Career Information (ACSCI) (28), the National Occupational Information Coordinating Committee (NOICC) (29), and the U.S. Department of Labor (30). States such as California (24), Florida (25), North Carolina (26) and Virginia (27) have reported results of feasibility and evaluation studies. The outcome of this phase was a preliminary set of system criteria, which was refined in subsequent steps of the study.

Identification of key user groups. Next, key user groups were identified. Direct users included CETA clients, job service applicants, community college and university students, secondary school students, rehabilitation services clients, offenders, public aid recipients and veterans. Intermediate users included counselors in secondary schools, vocational schools, colleges and social service agencies. A structured interview protocol was designed and used with representatives of potential user groups throughout the state. The outcomes of this phase were incorporated into the preliminary set of system criteria.

Public Workshops. The final step of the process was to hold public workshops in strategic areas of the state, one each in northern, central and southern Illinois. Two techniques were used here. The nominal group technique* yielded ranked lists of the top five to seven criteria from each workshop. Furthermore, participants completed questionnaires to provide more specific information than the NGT allowed. Outcomes from the NGTs and the questionnaires were added to the existing criteria and a final set was constructed.

Evaluation model. Since the criteria set encompassed a broad spectrum of considerations, an efficient method for evaluation was required. The criteria tree, based on multi-attribute utility theory was developed (31). The criteria tree served as a hierarchical alternative to the weighted checklist approach. The purpose here was to transform a description of each vendor system into a single number, termed its value. There were several advantages to the hierarchical approach: first, as a graphic display, it was visually appealing; second, it captured the relationships among the criteria in a very compact and organized format; third, it reduced assessment error due to cognitive limitations in comparing a large number of criteria.

Use of this model implied two assumptions: first, that the criteria were independent; second, that the relative weight of each criterion can be assigned. It was felt that the problem of vendor system selection did not contradict these assumptions.

* The nominal group technique (NGT) is a structured group process developed by Andre Delbecq and Andrew Van de Ven to generate ideas and reach group consensus.

Once the model was selected, the task remained to determine relative weights for the criteria. A technique first proposed by Miller (31) was used, in which a hierarchy of the criteria was developed. The process was first to identify the high level objectives (deliverer, system, content) which are then divided into sub-criteria (vendor and user services, software and media, information development and information delivery, respectively) and sub-sub-criteria. A very organized view of the criteria was produced in this manner (See Figure 5).

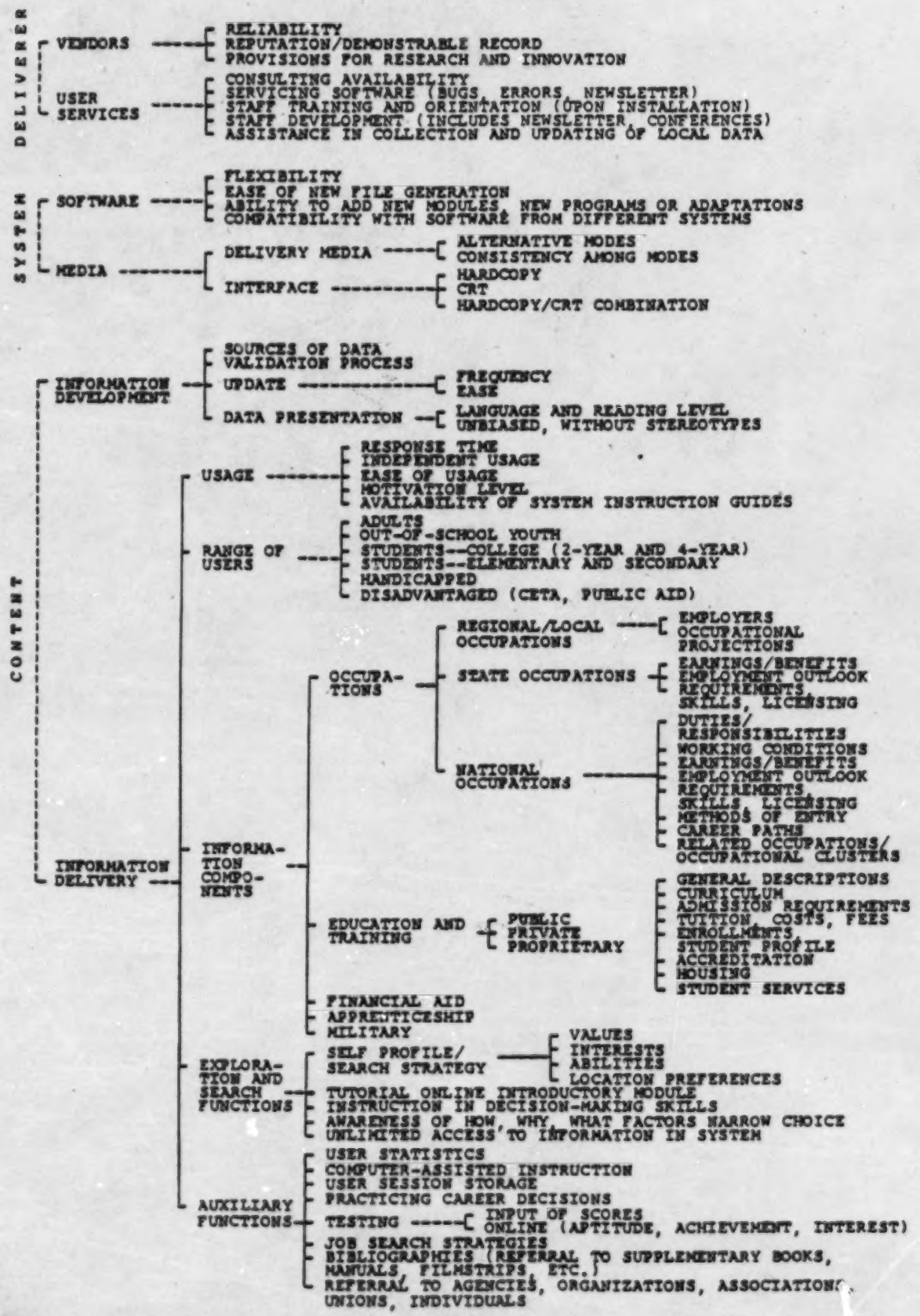
insert Figure 5 about here

Next, the weight assigning process was to allocate 100 points among the criteria in each group of criteria, beginning with the lowest level, that is, at the right side of the tree, and continue to each successive higher level until all criteria were assigned weights.

Through the various data gathering activities--interviews, workshop NGT sessions and questionnaires, the Project Staff had an estimate for the relative importance, that is, the weight, of each criterion. However, the Project Staff decided to validate this estimate, and at the same time, to involve the CIPAC, a representative decision-making body, directly in the evaluation process. The voting members of CIPAC were invited to make their own determination of the relative weight of each criterion, without knowing the weights previously assigned by the Project Staff.

Figure 5

CRITERIA TREE



Comparison of the averaged CIPAC weights with the averaged Project Staff weights showed little difference. The averaged CIPAC weights were adopted as the final set of weights.

Evaluation of vendor systems. A five-point scale was used to rate each vendor system on each criterion, where 0=do not recommend this system based on this criterion alone, 1=prediction poor, 2=indifferent, 3=prediction good, 4=recommend this system based on this criterion alone. After the rating was completed, the score for each system for each criterion was multiplied by the weight assigned for that criterion. Next, the weighted scores were summed for each system.

The top five systems, DISCOVER, EXPLORE, CIS, GIS, CHOICES, warranted further investigation as to specific system features and capabilities, cost, hardware/software compatibility and ability to run on the existing computer networks in Illinois. These choices were then narrowed to three vendor systems: DISCOVER, CIS, CHOICES. Figure 6 compares several of these features for DISCOVER, CIS and CHOICES.

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insert Figure 6 about here

SYSTEM	Distinguishing Features	Users	Costs	Deliverables
DISCOVER	• Easy access, all directions are on CRT • Comprehensive guidance and information features; user can proceed through modules (approx. 7 hours) or access specific information directly • Two versions--secondary and college/adult • Job search strategy module • Retention of user information • User ability to practice career decision-making • 422 occupational descriptions • FrameBuilder language offers high degree of flexibility and state independence • Ability to get statewide system started quickly	• Secondary Schools • Community Colleges • 4-yr. Colleges • Public Libraries • Area Career/Voc. Centers • Military Educ. Centers • Adults	$1000 per month per mainframe for 24 months (DISCOVER Found. $1250 per month per mainframe for 24 months (IBM) $1500 annual update tapes per mainframe $1300-1500 approx. for training	• Systems Installation • In-Service Training • Student Orientation Materials • Local Files Operations Manual • Data Base management Operations Manual • Maintenance of program, text and data files
CHOICES	• Four routes to access system: EXPLORE, SPECIFIC, COMPARE, RELATED • Occupations in SOC codes • Compare feature for occupations and schools--up to 3 at a time • Counselor summary print-out • Consortium of state systems to share cost and effort of enhancements • 1,100 primary Canadian occupations; 3,200 similar occupations	• Secondary Schools (also Middle Schools) • Colleges • CETA • Employment Service	$1000 one time fee $200 (approx.) School Program Tape from N. Carolina Training Costs Approx. $20000	• Tape containing functional CHOICES system (North Carolina enhancements) • Documentation to render system operational
CIS	• Linked system; no dead ends • QUEST access strategy--match interests, aptitudes and preferences to occup. • 300 word occupational descriptions • Preparation File--statement for each occupation in system, skills needed, licensing requirements, cross references to appropriate post-secondary education/ training • Compare feature for schools • Ability to use Strong-Campbell with CIS • Users group for collective system development • 249 occupations • Two modes of delivery (computer and needlesort)	• Secondary Schools • Community Colleges • 4-yr. Colleges • CETA (Prime sponsors and sub-grantees) • Correctional Inst.	$7000 First language version (one time charge $1000 Annual maintenance fee each version	• Basic Software and Training Materials • Occupational File development • Educ. File development • Attribute Code Training • Occup. File Maintenance

Figure 6
System Summary

FEASIBILITY STUDY RESULTS

Introduction

The Illinois CIDS Feasibility Study yielded results in three areas of interest: information, both up-to-date vendor system and statewide system descriptions; methodology, the process of criteria building and the development of the criteria tree; and recommendations to the CIPAC supported by a statewide system implementation plan.

Methodology

The process of criteria building through attention to Illinois user needs was unique to this Study; no other state feasibility study attempted to incorporate user needs directly into the vendor system selection. In addition, use of the criteria tree, primarily a management decision-making tool, in this context was unique.

Paralleling the development of the criteria tree was the development of alternatives to the selection of a vendor system. Other states had not considered these possibilities. The first alternative was a research and development model, where a microcomputer-based system would be designed to Illinois specifications. A second alternative was a facilitative model, where the state would provide no direct services to users, but rather would provide state and local labor market information to existing career information systems and centers. In this model, the state would also advise those organizations, agencies, institutions or consortia in setting up local career information systems. A third alternative was the computer-assisted guidance and instruction model, in which a career information system would be incorporated into a computer-assisted instruction package, such as PLATO.

Recommendations

The recommendation to Illinois was to implement DISCOVER as the statewide system and deliver it on the statewide computer network. This centralized system already services the agencies which handle a significant percentage of the target populations--out-of-school youth and the disadvantaged, such as CETA clients, unemployed persons and public aid recipients. This and the compatibility of DISCOVER to the state computer system would permit an almost immediate CIDS start up.

In addition, it was recommended that DISCOVER be adapted to run on PLATO which would allow access to computer-assisted instruction as well as computer-assisted guidance. PLATO terminals are located in many Illinois colleges, high schools, hospitals and prisons, so that this network could extend CIDS delivery. Adapting DISCOVER to PLATO was recommended to be undertaken concurrent with the development of Illinois-specific occupational and educational information. It was envisioned that, when fully operational, these two networks would provide a desirable blend of national, state and local data, as well as instructional opportunities.

This two-part recommendation was supported by an implementation plan. This plan addressed the policy issues involved: administration/management, including location, advisory committee, staff; finance, including revenue and expenses; information development; user services; marketing.

CONCLUSION

The development of computer-based career information systems represents the melding of interests and efforts of many previously isolated agencies and organizations which were pledged to similar missions and often committed to overlapping or duplicative tasks. The NOICC organization has been a prime mover in the consolidation of endeavors in career information collection, processing and dissemination. Membership of the Technical Steering Group which governs NOICC activities reflects the integration of related functions in the departments of education and labor. Representatives from the National Center for Education Statistics, the Bureau of Labor Statistics, the Employment and Training Administration as well as individuals in education and/or labor who deal with youth and adult education and employment issues determine NOICC policy. On the state level, the SOICCs include representatives from the state board which administers vocational education, the state agency which administers vocational rehabilitation and the state employment and training council.

The integrative nature of the NOICC and SOICCs indicates the significance of the availability of accurate, reliable occupational/career information on the micro and macro levels. On the micro level systems are strongly consumer oriented in their approach, promoting empowerment rather than dependency in job/career selection. The rational approach to career selection presents the user of computer systems with a clear notion of the tradeoffs he/she must make as the quality of work life, wages, hours, employment prospects and advancement potential are compared.

There ensues a clear realization that achievement of some goals entails compromise of others. Individuals are encouraged to match personal needs and economic realities, to anticipate change and develop personal resources commensurate with future possibilities. By internalizing the logical process of career decision making and having access to critical information over a lifetime, persons are able to adapt to new technologies and even "manage" change rather than merely "cope" or "adapt" to it. The coalition of agencies and organizations, on the micro level, are supporting self-directed, planful workforce response to change. That responsiveness has macro implications in preventing or at least meeting imbalances in the labor market.

Assuming the continuation of these systems and the rapid pace of innovation in hard- and software, some if not all of the following will be incorporated in systems: enriched data bases which include reliable employer forecasts founded on more sophisticated long range human resource planning than is currently practiced; more qualitative data regarding the ethos of particular work environments; more information of internal labor markets with corresponding data regarding job/career ladders and/or job/occupational clusters; current job openings provided by local area of usage, and instruction in relevant areas, such as composition, basic computation, GED preparation and even job search techniques and behaviors. The potential for computer-based career information and guidance systems appears limitless.

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